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ENTOMOLOGICAL NEWS

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Unorthodox and Abnormal Structures of Lepidoptera.

By JOSEPH L. WILLIAMS, Lincoln University, Pennsylvania.

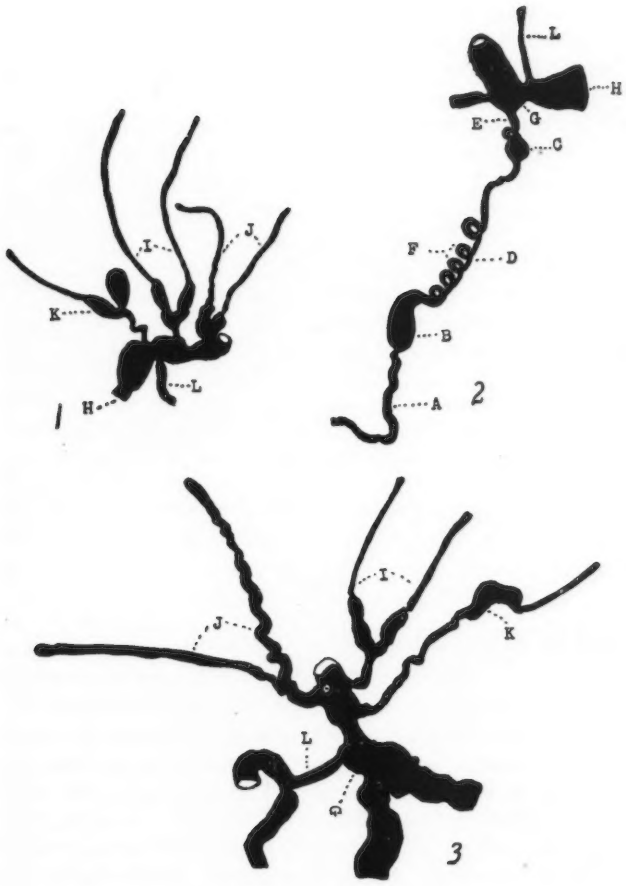
During the season of 1941, while studying the internal genitalia of female Lepidoptera, a number of unorthodox and abnormal structures were encountered. The abdomens of fresh females were cut from the thorax, dissected in salt solution and the reproductive organs removed for study. The peculiar structures were an undeveloped reproductive system of *Plathypena scabra* Fabr., double posterior wings of *Sparganothis sulfureana* Clem., one ovary consisting of four egg-tubes and the other three of *Agrotis ypsilon* Rott., an unorthodox spermatheca of *Drepanulatrix liberaria* Wlk. and two pairs of colleterial glands of *Utetheisa bella* L. and *Synchlora aerata* Fabr.

The female of *P. scabra* was captured while flying, apparently normal, around a light in the house. When dissected the reproductive organs appeared as follows: the egg-tubes contained eggs, which were scarcely larger at the pedicels than those at the base of the terminal filaments. The specimen was virgin, since no spermatophore was in the bursal sac. She, therefore, was probably unable to attract males in spite of her great activity. The volume of the bursa appeared smaller than that of a normal virgin. The volume of the spermathecal chamber was apparently smaller than that of a normal female. Other characters of the spermatheca were normal. The accessory or colleterial gland vesicles were completely devoid of secretion, which is normally found in these structures if the female is virgin or has laid only a few eggs. No abdominal parasites, which would give reason for this condition, were found.

Two metathoracic wings were observed on the left side and the normal one on the right side of *S. Sulfureana*. Unfortunately this abnormality was destroyed when the abdomen was removed from the thorax. An examination of the internal genitalia revealed them to be normal.

Four egg-tubes normally compose the ovary of *A. ypsilon*. The eggs in the tubes of both ovaries were normal in size. No evidence of the fourth tube of the three-tubed ovary was indicated. Other structures of the genitalia were normal. A spermatophore was present in the U-shaped bursa copulatrix. This abnormality, therefore, did not prevent the female from attracting males.

There are two types of spermathecae commonly found in Lepidoptera. The first type consists of a chamber with the spermathecal gland extending from it. A sac joins the lower part of the chamber by means of a duct. These structures are connected to the vagina by means of the spermathecal duct (fig. 1). The second type is similar to the first except for the lack of the sac (fig. 3). A third type is found in *Drepanulatrix liberaria*. This differs from the others as follows: the gland (fig. 2, A) extends from the chamber (fig. 2, B), which is connected to another chamber (fig. 2, C) by means of a duct. This duct (fig. 2, D) is similar to the duct of other Lepidoptera. Another duct (fig. 2, E) opens into the vestibulum on the vagina. This character differs from the general condition, since the duct extending from the first chamber opens into a second instead of the vagina. The second chamber may be a specialized part of the spermathecal duct. If this be so the length of the duct, considering variations, in this species is longer than that of other species. Inside of the second chamber, which is somewhat semi-transparent, a six-coiled structure appears to be continuous with the ducts leading to and from it. It may be suggested that these coils are similar to those generally found below the first chamber. This could hardly be true, since similar coils are present below the first chamber (fig. 2, F). This type of spermatheca apparently is not confined to this species. Petersen demonstrates a similar type in *Bembecia hylaciformis* Lasp. and *Nepticula* sp., ?, but makes



Female Genitalia of: 1. *Synchlora acrata*, 2. *Drepanulatrix liberaria*, 3. *Utetheisa bella*.

A, Spermathecal gland; B, Spermathecal chamber; C, Second chamber; D, Spermathecal duct; E, Second duct; F, Coils of Spermathecal duct; G, Vagina; H, Median oviduct; I, Accessory or colleterial glands; J, Second pair of colleterial glands; K, Spermatheca; L, Seminal duct.

no comment concerning them.

The last and most interesting structures are colleterial glands behind the usual pair in *Utetheisa bella* and *Synchlora aerata*. These glands do not open into the egg-duct through a common duct. They open separately into the egg-duct on its dorsal side. This differs from the common colleterial glands, since they open into the egg-duct by means of a common duct. The ventral position of these glands shown in figure three of *U. bella* is because the egg-duct is lying on top of them. Those of *S. aerata* have vesicles at their bases (fig. 1). Similar structures were in other species, but the unorthodox structures were removed without my being aware of their significance. Some were extensively branched. All of the branches led to the duct opening into the posterior part of the egg-duct. No explanation as to their function can be suggested.

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A List of the Dragonflies (Odonata) taken near Brevard, North Carolina.

By MINTER J. WESTFALL, JR., Cornell University.

For the past four summers I have been a counsellor at Camp Carolina, about 1½ miles from Brevard, North Carolina, which has an elevation of about 2,300 feet. During the summer of 1938 very little collecting of Odonata was done, but during the past three summers I have taken quite a large number of specimens. Some of these were sent to Dr. J. G. Needham for the Cornell collection, others are in the collections at Ohio State University, the University of Michigan, and Rollins College, while still others are in my personal collection and the collections of various students of this group of insects.

The check list of the insects of North Carolina which was published by Dr. C. S. Brimley in 1938 with additional species added recently includes 135 species without the further species treated in this paper. Dr. Brimley's list has been very helpful and we understand that a list of corrections and additions is being compiled and may be published prior to this paper.

After carefully checking my records of North Carolina Odonata I find that I have taken seven species there which were not listed in Dr. Brimley's card catalog, although I have now sent him these records. Each of these seven species is indicated in the following list by an asterisk. Also in checking my records further species appeared which might make an interesting addition to the literature for the state. Therefore I have decided to publish an annotated list of the species collected, with comments where they seem advisable. Definite dates are given where they seem important.

Considering the limited area and time of collecting covered by this paper it seems remarkable that such a large number of species should be taken. As a counsellor at camp, my activities were restricted during July and August of each summer to the camp property for the most part. On the grounds of Camp Carolina there is an artificial lake of eight acres which is fed by three small mountain streams and several small springs near the lake. At one corner of the lake there is a cove with a grassy edge and shallow water, into which flows the water from several small springs and a larger stream. Here we do most of our collecting at camp. About the middle of September the lake is drained and then is not filled again until the next Spring. This lake will be referred to as the camp lake.

The boys at camp have taken a great interest in the dragonflies and a contest among them to see who could collect the largest number of species has been very popular. The lists of species collected are placed on the front porch of the nature shop in the form of a chart, and each boy proudly points to the list of scientific names accredited to his collection. One of the boys, Bill Thomson, in 1941 was successful in netting 49 species. It is surprising how well the boys learn the scien-

tific names and identify the specimens with the aid of a named collection on display, as well as the keys and books which are available. This plan might be adopted with success by other nature counsellors and more information would be furnished on request.

Besides the collecting on the camp lake, several trips were made each summer to other lakes near Hendersonville and also to a few rivers. It is hoped that with more of these trips still other species may be added.

Four of these collecting localities deserve special mention to make the annotated list better understood. Lake Osceola is located about two miles southwest of Hendersonville. It is about three-fourths to a mile in length and about one-fourth of a mile wide. At one end there are several shallow coves with lily pads and reeds growing there. It is around the upper end where several streams enter that one finds the best collecting.

Lake Kanuga is a medium sized lake, somewhat larger than the camp lake, and is artificially made as are most of the small lakes of this region. It is about six miles southwest of Hendersonville. The upper end is quite marshy and is an ideal collecting spot if one doesn't mind wading in mud and water.

On the French Broad River from Pisgah Forest to Long Shoals, a distance of about forty miles, I have seen a large number of dragonflies, but have collected few of them since we were on the camp canoe trip almost every time and could not stop. Various strange Gomphines, quite a few Macromias, and others have been seen there. The river varies in width from perhaps fifty feet to three-fourths of a mile near Long Shoals. In some places it is quite shallow and rocky, while again it is deeper and fallen trees and brush are piled up here and there.

The Davidson River in Pisgah National Forest is a shallow, rocky stream in which the water is usually clear and cold. While the dragonfly population along the part of the stream studied was not so large, it contained a few interesting species. A similar river, but one which is usually deeper, narrower, and which runs through slightly lower country, is the Little

River which is also near Brevard. I collected some there also in 1941.

The Odonata in general seemed more abundant during the summer of 1941 than during any of the preceding three summers. Unusually common were *Tachopteryx thoreyi, Anax junius, Tramea lacerata, Chromagrion conditum,* and *Enallagma civile.* Other insects including gnats, mosquitos, and sweat bees were unusually abundant. It has been postulated that the exceptionally warm weather might have had some bearing on this situation.

The annotated list of eighty species collected to date follows. Specimens about which there was any doubt as to the identity have been checked carefully by Mrs. Leonora K. Gloyd, and Dr. J. G. Needham. Dr. P. P. Calvert has also kindly checked several species for me. At various times sight records have been made of Odonata not in this list, but they are omitted until specimens are obtained. All collections mentioned were of adults unless otherwise stated.

1. TACHOPTERYX THOREYI (Hagen). Not uncommon around camp lake and in Pisgah Forest from June to August. This has been one of the most interesting of the Odonata at camp. I shall never forget the first specimen collected. One had previously been seen in Pisgah Forest but was not collected. Then on one occasion while I was walking around the camp lake, something suddenly lit on my shirt. To see such a large dragonfly as *Tachopteryx* there was really a surprise, but before anything could be done about it he was gone. Some time later when he had been given up as lost, I happened to notice him perched on the rim of my net. Of course he was soon in the cyanide bottle. We have also caught them from the trunk of a tree by first touching the abdomen so the net may be slipped under it as has been described by Williamson. Also we have picked them from such places by hand, first pinning the wings to the tree or post with the fingers. Once a specimen flew down into the net, and again when one lit on the outside a quick stroke inverted the net before the big fellow had time to leave. We have watched the boys at

camp go through similar experiences as our own and occasionally they come running in to tell of a large dragonfly which was so friendly. One boy when I told him a *Tachopteryx* was on his head, hesitated for a second or two and then suddenly threw his net over his head, trapping the dragonfly. At least 35 specimens were taken and many more seen from June 14 to August 18, 1941.

2. PROGOMPHUS OBSCURUS (Rambur). One male was taken on the sandy shore of a small stream leading into Lake Osceola on June 15, 1941. Another was taken on the sandy shore of Lake Kanuga on June 17, 1941, while one seen on the Little River, June 20, 1941, was too alert to catch.

3. HAGENIUS BREVISTYLUS Selys. Occasional on the French Broad and Davidson Rivers, and at camp lake from June to August.

*4. GOMPHUS (ARIGOMPHUS) VILLOSIPES Selys. The one common Gomphine on the lakes in June, although only one female has been taken. At each of the lakes mentioned males of this species were often found alighting on floating vegetation and were easy to collect. In June of 1941 only a few were seen.

5. GOMPHUS LIVIDUS Selys. Occasional specimens taken near camp lake in June. One male collected on small stream leading into Lake Osceola, June 15, 1941.

6. G. PARVIDENS Currie. The males of this species were found commonly along the French Broad River, June 18, 1941, when 14 were collected. 11 males were taken on the Little River, nearby, on June 20. This species, unlike most Gomphines I have collected, was almost always seen perched several feet above the water on the leaves of some shrub. Especially were they found commonly near where there were rapids and it was the hardest to manipulate the canoe in catching them. They were not particularly wary and could be closely approached without too much caution. Sometimes they alighted on logs or stones near the shore, and almost always spent more time at rest than in flight.

*7. G. (STYLURUS) LAURAE Williamson. Five specimens

taken; others seen several times on the French Broad River. A female was taken at the camp lake, July 16, 1939. A male from the same place, August 9, was identified by Dr. Needham. Another male was taken on the French Broad River, September 7, 1940, and was identified by Dr. Calvert. One female, French Broad River, July 28, 1941, and another from the Little River, August 4, 1941.

8 G. (STYLURUS) PLAGIATUS Selys. One male was taken on French Broad River, August 29, 1941, and others were seen at that time.

9. G. (STYLURUS) SPINICEPS Walsh. A male was taken on the French Broad River, August 27, 1941, and two more males were collected there on August 29. A mature nymph was taken on the same river, July 29, 1941.

10. DROMOGOMPHUS SPINOSUS Selys. One male of this species was taken at Lake Osceola on June 18, 1940.

11. LANTHUS ALBISTYLUS (Hagen). About six males were taken on the Davidson River, June 20, 1939, as they lit on rocks in the center of the stream. One female was found just emerging on the sandy bank of the river and was collected with the cast skin. Two males were taken and others seen at the same place on August 3, 1941, while a female was collected on August 17.

12. L. PARVULUS (Selys). A single male was taken along a spring-fed ditch near camp lake on June 12, 1941. Many nymphs were found there the last of August.

13. BOYERIA VINOSA (Say). Quite common on the rivers and a few taken on streams near camp lake during July and August.

14. ANAX LONGIPES Hagen. A few specimens taken at camp lake in July. I now note one male and one female collected July 12, 1931. A specimen was also seen at Lake Kanuga June 13, 1940.

15. A. JUNIUS (Drury). Quite common. Abundant in 1941. Many nymphs taken in camp lake.

16. EPIAESCHNA HEROS (Fabricius). Rare. One dead specimen picked up at camp lake, June 30, 1939.

*17. AESCHNA VERTICALIS Hagen. Four males collected in marsh at Lake Kanuga on August 28, 1939. Quite a few others were seen.

18. AE. UMBROSA Walker. About eight specimens taken during August and September of 1940 at the camp lake. Flying both during the day and at dusk. None of this species was collected in other years.

19. CORDULEGASTER DIASTATOPS (Selys). Occasional at camp lake during June and early July. One female was taken while ovipositing in a very small stream near the camp lake on June 12, 1941, at about 7:15 P. M.

20. C. ERRONEUS Hagen. Quite common for about two weeks in August near the camp lake. They are easily collected as they slowly fly up and down a couple of ditches leading into the lake. This definite habit of patrolling the ditches has not been noticed as much with *C. diastatops*. On August 15, 1941, a female was seen flying slowly along a small spring-fed ditch about 75 yds. from the lake. She hovered here and there to deposit her eggs by dipping her abdomen into the shallow water. We began to dig around in the sand and debris of the bottom and soon found several nymphs of *Cordulegaster*. With further sifting the smaller ones were found to be common almost all the way to the lake.

21. MACROMIA GEORGINA (Selys). One male collected at camp lake, August 4, 1939, and verified by Dr. Needham. Another taken at the same place on August 18, 1940, was at first thought by Mrs. Gloyd to be *M. alleghaniensis*, but after direct comparison with specimens in the Williamson collection she decided it was this species.

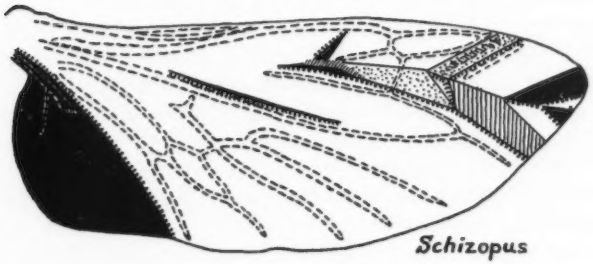
22. M. ALLEGHANIENSIS Williamson. Nine males and one female taken on the Little River near Brevard, June 20, 1941, seem to combine some of what were thought to be the distinguishing characteristics of this and the following species into one. There is therefore some doubt as to the identity, but since more of the characters according to Williamson's paper of 1908 seem to point to this species I am for the present placing them here. With more study there will probably be some changes made in specimens referred to these three species.

(To be continued)

The Wing of the Schizopini (Coleoptera: Dascillidae).

By Wm. T. M. Forbes, Cornell University, Ithaca, New York.

Schizopus, with its closely related genera, *Dystaxia* and *Glyptoscelimorpha,* has been generally placed in the Buprestidae, as a mere tribe, though Good in 1925 (Ann. Ent. Soc. Am. 18: 271) rejected them from the family, and published the venations of all three genera in comparison with that of *Dascillus* (figs. 42, 43, 48, vs. 41). More recently I have examined the wing folding of *Schizopus* (figure) and find that it, like the venation, is of a different type from any of the Buprestidae, and like that of *Dascillus* (Jour. N. Y. Ent. Soc. 34, fig. 61, 1926). In particular both *Dascillus* and *Schizopus* have a normal hinge system at the end of the "cell", which is lacking in even the most complexly folded Buprestidae (Good, figs. 36, 44).



Wing-venation and folding of *Schizopus lactus.* The symbols and conventions are as in my major paper on the wing-folding—Jour. N. Y. Ent. Soc. 34: 42-139 with pls. 7-18.

On the more conventional characters,—the fusion of the first two ventral segments of the abdomen and the spherical fore coxae, *Schizopus* goes correctly enough with the Buprestidae, but there are several other external points of likeness between *Schizopus* and *Dascillus*: the cleft last membranous lobe of the tarsi and the very wide side piece of the metasternum which are the traditional tribal characters of the Schizo-

pini are both shared by *Dascillus* and by no other Buprestidae examined. And another character is the dorsum of the abdomen; in all true Buprestidae examined it is heavily chitinized and punctate, like any proper external surface of the body;—in *Dascillus* and *Schizopus* it is smooth, glossy and lightly chitinized, though heavier than in most beetles, and the setigerous punctures are confined to a narrow posterior band on each segment. This last is, I believe, an important character, for it separates the Buprestidae from practically all the rest of the Coleoptera.

As to the ventral process of the prosternum, used by Bradley for his key character, it is present in *Dascillus* as well as *Schizopus* and the Buprestidae, though not quite as well fitted into the mesosternum; in *Anorus,* the only other Dascillid at hand which is really closely related, the spine is still looser.

Another group with the same venation and folding is the true Rhipiceridae (with *Sandalus* as well as *Rhipicera*[1]). The connection with *Dascillus* is close, the main difference being the presence of an empodium; the prosternal spine is reduced, more like *Anorus* than even *Dascillus,* but the lateral piece of the metasternum is enormous, even wider than in *Schizopus.*

In sum I propose to transfer the *Schizopini* from the Buprestidae to the Dascillidae, where they will be tribally distinguished by the ankylosed first two ventral segments and much narrower prosternum, the latter character carrying with it a practically spherical fore coxa.

Postscript: Since this article was sent to the NEWS, Bryant E. Rees has published the first stage larva in Proc. Ent. Soc. Wash. xliii, 210-222, 1941. His conclusion is that the Schizopini form a distinct family,—Schizopodidae of Leconte, 1859.

[1] Craighead has slipped up in forming the family Sandalidae, as I believe, for *Sandalus* is certainly very close to *Rhipicera,* even having the same striking sexual dimorphism. The aberrant form which should have had a family name, was *Callirhipis,* though if one defines families very broadly it could perhaps enter the Elateridae along with *Zenoa.*

Notes on some North American Hesperiidae with the Description of a New Race of Polites verna (Edwards) (Lepidoptera, Rhopalocera).

By H. A. Freeman, White Deer, Texas.

All the localities mentioned below are in Texas unless otherwise stated.

Erynnis burgessi (Skinner). 1 ♂, March 3, 1938, Dallas; 1 ♂, April 7, 1940, and 2 ♀ ♀, March 31, 1941, Cedar Hill, Dallas County. These four specimens appear to be the first of this species taken in Texas; previously the known range of this species was Utah, Mexico, Arizona, New Mexico and Colorado. The determination of these specimens was made by a study of the genitalia of the males.

Erynnis baptisiae (Forbes). 2 ♀ ♀, April 19, 1941, 1 ♀, April 20, 1941, 2 ♂ ♂, 1 ♀, May 31, 1941, Lancaster; 2 ♀ ♀, August 22, 1940, Vickery; 1 ♀, March 15, 1938, Dallas.

As far as I am able to gather the above records are the only ones for this species in Texas. Mr. E. L. Bell examined the genitalia and informed me that the details appear to be those of this species. It was interesting to note that there were no species of *Baptisia* growing in any of the localities where these specimens were taken.

Hesperia uncas Edwards. 3 ♂ ♂, August 18, 1941, 3 ♂ ♂, and 1 ♀, August 21, 1941, 20 miles north of White Deer, Carson County; 2 ♂ ♂, August 30, 1941, 1 ♀, September 4, 1941, White Deer.

As far as I am able to ascertain this species has never been recorded from Texas previously. In addition to the ten specimens caught several others were seen, so this species must be native to this part of the Panhandle.

Hesperia meskei (Edwards). 1 ♀, June 30, 1930, North Little Rock, Arkansas. 1 ♀, August 22, 1933, Hope Hill Farm, Faulkner County, Arkansas. Arkansas can now be included in the range of this rather rare species. From the dates of the two specimens this species must be double brooded there.

Polites verna sequoyah n. ssp.

This new race differs from typical *verna* (Edwards) in the following particulars: smaller in size, mounted males average 26 mm., females 27 mm., whereas typical *verna* males average 29 mm. and the females 33 mm. The spot at the end of the cell of the primaries of *verna* is usually prominent, while in *sequoyah* it is absent or else very faintly indicated. All the other spots present in *verna* are smaller in proportion in *sequoyah*. On the under side the coloration is a warmer brown than *verna* and there are fewer fulvous hairs toward the base of the secondaries. These hairs in *verna* give the specimen a yellowish cast, while in *sequoyah* the coloration of that part of the wings is darker. On the under side of the primaries of *sequoyah* there is less fulvous overscaling and the general coloration is darker. On the under side of the secondaries the violet reflection present in some specimens of *verna* is more pronounced in *sequoyah* and the general coloration is a warmer brown, produced by a number of reddish, metallic scales. The faint indication of spots present in *verna* is slightly better defined in *sequoyah*, especially toward the lower part of the wings.

Specimens of this new southern race were compared with typical *verna* from Rhode Island, Ohio, and New York. Following the example of previous authors in this genus, this new race is named in honor of Sequoyah, the Cherokee Indian Chief.

Described from sixteen specimens, eleven males and five females, collected at Hope Hill Farm, Faulkner County, ARKANSAS and Little Rock, Arkansas by the author during May and July of 1933, 1940, and 1941.

Holotype ♂ and *allotype* ♀ are in the collection of the author. *Paratypes,* ten ♂ ♂ and four ♀ ♀, will be disposed as follows: one pair to the American Museum of Natural History, New York, New York; one pair to the Academy of Natural Sciences, Philadelphia, Pennsylvania; one pair to the United States National Museum, Washington, D. C.; one ♂ to the collection of Mr. Cyril F. dos Passos, Mendham, New Jersey; one ♂ to the collection of Mr. Otto Buchholz, Roselle Park, New Jersey; one ♂ to the collection of Mr. Don B. Stallings and Dr. J. E. Turner, Caldwell, Kansas; and one ♂ to the collection of Mr. Lowell Hulbirt, Glendora, California. The

other four *paratypes* will remain for the present in the collection of the author.

ATRYTONE DION race ALABAMAE Lindsey. 1 ♀, June 10, 1941, Lancaster.

Since recording the occurrence of this race in Arkansas in "Field and Laboratory, January, 1941, Vol. IX, No. 1, P. 29" a female of this race was taken by the author on thistles near Lancaster, Texas. This is the first time this race or the species has been seen in Texas.

ATRYTONE DUKESI Lindsey. 1 ♂, July 10, 1940, Sylvania, Ohio (Donald Eff, Coll.).

The above specimen, sent to me by Mr. Donald Eff, is the only record of this species having been taken in Ohio.

AMBLYSCIRTES BELLI Freeman. 1 ♂, July 25, 1941, Checatoh, Oklahoma. 1 ♂, July 5, 1941, North Little Rock, Arkansas (Dr. J. E. Turner, coll.). 11 ♂ ♂, and 8 ♀ ♀, July 20-23, 1941, Little Rock Arkansas. 1 ♂, July 25, 1929, Willard, Missouri (Dr. A. E. Brower, coll.).

Dr. A. E. Brower recorded the capture of a specimen of *Amblyscirtes celia* Skinner at Willard, Missouri "Entomological News, xli, '30, P. 289". After collecting *belli* in Arkansas and Oklahoma I wrote Dr. Brower asking about the specimen he recorded as *celia*. He very kindly sent the specimen to me for examination and it turned out to be a ♂ *belli*. Until 1941 I had seen *belli* only from the type localities of Lancaster and Vickery, Dallas County, Texas, so from the above data this species has a much more extensive range than was previously thought.

LERODEA TRIPUNCTUS (Herrich-Schaeffer). 1 ♂, August 18, 1939, Brickell Hammock, Miami, Florida; 1 ♀, September 6, 1939, Miami, Florida; 1 ♂, June 20, 1937, Miami, Florida (in the collection of A. C. Frederick, Albany, New York); all three specimens collected by F. N. Young.

Dr. J. McDunnough in his "Check List of the Lepidoptera of Canada and the United States of America" (1938, Memoirs Southern California Academy of Sciences, 1, p. 35) preceded this species by an asterisk indicating that it is of doubtful North American occurrence. From the data contained

on the three specimens above, two of which were sent to me by Mr. A. C. Frederick, Albany, New York, and the third contained in his collection, any doubt as to the occurrence of this species within the limits of the United States should now be removed.

A New Species of Oedematocera with Notes and key (Tachinidae, Diptera)[1].

By H. J. REINHARD, College Station, Texas.

The relationships of this genus were discussed by Aldrich in 1928 (Ent. News, 39: 301-4). In this reference it is pointed out that Townsend's *Schistocercophaga,* proposed for *Oedematocera dampfi* Ald., is characterized largely in the form of a comparison with *Hypophorinia.* Aldrich cited at least five important characters which show that these genera differ widely from each other and are not members of even the same tribe. Subsequently Townsend placed *Schistocercophaga* in the tribe Hyperecteinini, along with *Oedematocera,* far removed from *Hypophorinia* in the tribe Phoriniini. In the latest key to Hyperecteinini (Townsend, Manual of Myiology, Part IV: 162) the two supposed genera trace to the same couplet and are separated on the difference of one frontal bristle beneath the base of the antennae and some variation in the length of the third antennal segment in the male sex. Neither these characters nor any listed in the recent generic diagnoses (loc. cit., Part X: 310, 313-14) show outstanding differences common to both sexes and apparently *Schistocercophaga* is superfluous, as Aldrich has already pointed out. The following key will assist in distinguishing the species of *Oedematocera,* including one new, described below.

[1] Contribution No. 707, Division of Entomology, Texas Agricutural Experiment Station.

KEY TO SPECIES OF OEDEMATOCERA.

1. Abdomen black or at least with distinct dark markings 2.
   Abdomen wholly yellow; pleura pale pilose; prosternum bare; antennae and aristae very long; male without orbitals and with facial ridges strongly bulged or convex in profile (Ohio, North Carolina to New England) ..*flaveola* Coq.
2. Prosternum setose or bristled ..... 3.
   Prosternum bare ..... 4.
3. Scutellum and abdomen wholly black; third antennal segment 3 to 4 times longer than second; arista thickened hardly to middle (Texas and Georgia to New England) .....*gilvipes* Coq.
   Scutellum and abdomen largely reddish yellow; third antennal segment 5 to 6 times longer than second; arista thickened on proximal three-fifths (New York) .....*optata*, n. sp.
4. Thorax with two broad well defined blackish stripes; cheek about one-eighth eye height; first abdominal segment without median marginals, female only (Panama) .....*striata* Ald.
   Thorax with four narrow indistinct brownish stripes; cheek nearly one-third eye height; first abdominal segment with a pair of median marginals (Mexico) .....*dampfi* Ald.

Oedematocera optata n. sp.

♂. Front at vertex 0.32 of head width, widening gradually downward to antennal base; parafrontal gray pollinose, wider than the reddish brown middle stripe; verticals two pairs but the outer much smaller than inner ones; frontals in a single row which hardly diverges anteriorly, two lowermost bristles beneath base of antennae; orbitals two proclinate pairs; ocellars proclinate and divaricate; face very deeply impressed, its lateral ridges nearly vertical and weakly bristled on lowest fourth; parafacial subsilvery, bare, narrowed downward to less than one-half width of third antennal segment; vibrissae strong, decussate, on oral margin; epistoma nearly as wide as clypeus and in plane of same; antennae as long as face, reddish yellow with third segment slightly darker, latter five or six times longer than second segment; arista finely pubescent, thickened on basal three-fifths which is reddish yellow, proximal segments short but distinct; cheek gray pollinose, nearly bare or with a few pale hairs along lower edge, about one-fifth eye-height; eyes bare; proboscis short, labella large, pale yellow; palpi slightly thickened apically, yellow; back of head flattened, gray pollinose, sparsely clothed with short pale hairs.

Thorax blackish, gray pollinose, with four dark dorsal stripes, outer ones broadly interrupted at suture and reduced to a triangular spot in front; scutellum reddish yellow in ground color beyond basal margin above. Chaetotaxy: acrostichal 2, 3; dorsocentral 3, 3; intraalar 3; supraalar 3; presutural 2; notopleural 2; posthumeral 2; humeral 3; postalar 2; pteropleural 1 (small); sternopleural 3 (lower front one small); scutellum with 3 lateral, 1 small divergent apical and 1 depressed subdiscal pair; sides of postnotum beneath calypters bare; prosternum with a single minute hair at each side; propleura bare; calypters opaque, whitish with a faint tawny tinge.

Abdomen reddish yellow with a black median vitta above which widens behind to include posterior margin of third segment and all of fourth, entire upper surface lightly dusted with pale yellowish gray patternless pollen; basal segments each with one pair of median marginal bristles; intermediate segments with a pair of discal bristles besides a marginal row on third; anal segment with a discal and a marginal row; genitalia reddish yellow, retracted; inner forceps moderately stout, divided and slightly divergent apically; outer forceps finger-like, narrower in profile than inner ones but nearly as long; fifth sternite wholly reddish yellow, with a rather shallow U-shaped apical incision, lobes sparsely beset with fine black hairs.

Legs reddish yellow with tarsi dark brown to blackish; hind tibiae not ciliated; claws and pulvilli short.

Wings gray hyaline with a faint tawny tinge near base and on costal margin; first vein bare, third with two hairs near base; fourth vein with a broad, even, stumpless bend; first posterior cell narrowly open shortly before exact wing tip; hind cross vein a trifle nearer bend than small cross vein; last section of fifth vein hardly two-fifths length of preceding section; costal spine vestigial.

♀.—Front at vertex 0.36 of head-width in one specimen; third antennal segment narrower and paler than in male; two sternopleurals; abdomen largely blackish above; genitalia retracted, not adapted for piercing; otherwise very similar to male.

Length: 6-7 mm.

Holotype: Male, "NEW YORK, July 8, 1935". *Allotype*, female, Cold Spring Harbor, Long Island, New York, August 20, 1927 (H. C. Hallock). The latter specimen, donated by H. C. Hallock, bears an Aldrich determination label, *"Oedematocera flaveola* Coq." There appears little doubt that this is the opposite sex of the male described above. The presence of orbitals in the latter and the setose prosternum indicate a closer relationship with *gilvipes* than with *flaveola.*

A Dehydration and Embedding Schedule for Insects.

By L. M. Bartlett.[1]

In the course of work on a thesis on insect histology, the author had occasion to use a technique for dehydration which has been modified from one given by Smith (1940)[2] for sectioning insect eggs which are rich in yolk and thus very friable. The chitinous insectan exoskeleton is also brittle, and thus presents the same difficulties as those encountered in the sectioning of eggs heavily laden with yolk. The method of dehydration given below has been used with considerable success for aquatic stages of mayflies, and a few German cockroaches have also been successfully sectioned by use of the method. The following sequence of steps was followed:

1. Drop the insect into lightly-boiling water for ¼-½ minute.

2. Transfer to Syracuse watch glass containing the fixative; cut slits in the thorax and abdomen, and inject a small quantity of fixative into the body cavity through these slits by means of a capillary pipette. Now place the insect in a vial of the fixative for the proper length of time, depending on which fixative is employed.

3. Transfer to 35% ethyl alcohol for from 2 hours to overnight (after the proper treatment required by the type of fixative used), or, in the event that alcohols of 70% or higher strengths have been employed in the treatment after fixation, proceed directly to step 4.

4. Transfer to a mixture of N-butyl and 50% ethyl alcohols in a ratio of 1:2 for 2-4 hours.

5. Transfer to a mixture of N-butyl and 50% ethyl alcohols in a ratio of 2:1, to each 150 cc. of which has been added 4½ pipettes full of phenol (melted by placing a bottle of phenol crystals in warm water) for 24-48 hours.

6. Transfer to N-butyl alcohol, C.P., for 4-8 hours.

7. Transfer to N-butyl alcohol, C.P., to each 150 cc. of

[1] Contribution from the Department of Entomology and Zoology, Massachusetts State College.

[2] Smith, S. G., 1940, A new embedding schedule for insect cytology. Stain Technology 15: 175-176.

which has been added 4½ pipettes full of phenol, for 12-24 hours.

8. Transfer to N-butyl alcohol and 50°-52° paraffin, in a ratio of about 1:1 by volume for 1-2 hours.

9. Transfer to 50°-52° paraffin for 1-2 hours.

10. Transfer to 56°-58° paraffin for 1½-3 hours.

11. Imbed in 58°-60° paraffin.

To date some 200 slides representing 42 specimens in 8 genera of mayflies have been sectioned after various types of fixation and dehydration methods. While this may not be enough work on which to base any definite conclusions, the following generalizations seem to be in order. Those fixatives which contain formalin (*e.g.*, Bouin's) do not give as good results as others; those fixatives containing nitric acid (*e.g.*, Gilson's) give the best results. For insects which are at least as heavily sclerotized as the German cockroach the dehydration method given above is superior to dehydration by dioxan or a graded series of ethyl alcohols.

The author wishes to express his thanks to Dr. J. R. Traver and Mr. H. Laudani for reading the manuscript and making suggestions thereon.

The Types and Status of Chrysops ceras (Diptera, Tabanidae).

By Cornelius B. Philip, Hamilton, Montana.

Although in Hines' last published opinion (1925), this species from New Mexico and Northern Mexico was considered a synonym of *C. megaceras* Bellardi, he again suggested their separateness in manuscript notes made during a visit to the British Museum. Through courtesy of Mr. H. Oldroyd of that institution, distinctness of the two has been amply verified through loan of a cotype of *ceras* and a well preserved specimen of *megaceras* in the Bigot collection. The latter is a much more brownish, and larger insect, the two basal antennal segments not as swollen, the wing picture more dense, some fumosity evident even in the basal cells, the dorsal, abdominal

incisures not pallid, and venter not uniformly gray pollinose.

As four of the six cotypes of *ceras* are in hopelessly damaged condition, the relatively intact specimen studied by the writer is here designated as lectotype. It bears the original, hand-written label "W. F. Gila, N.M., 7-10, 5 miles," and printed "Coll. Townsend," and the British Museum label "Purchased from E. Brünetti 1902." The specimen has had the head glued to the thorax thus resulting in partially obscuring the dorsal thoractic pattern by infiltration, and it lacks the two terminal joints of the right antenna, the joints from the tibia outward of the left fore-leg, and the stigmal portion of the costal margin of the right wing. It is in otherwise good condition and its characters closely agree with the original description with the following additional comments:

Front taller than broad; the callosity could be considered, (as described by Townsend) "roughly diamond shaped" with horizontal axis, the lateral points truncated, (*i.e.*, it is sharply subrectangulate above and below, but rounded on either side, a little broader than tall), the disc finely wrinkled as in other species of the group; the clypeus above the mouth more or less denuded; palpi brownish black, only the posterior margin "pale brownish," about three-fifths the length of the stylets. Distribution of brownish infuscation on legs and wings as indicated by Townsend, except lacking on apex of middle tibiae. The fumosity of the wings is irregular, indefinite and difficult to describe, but margins most of the outer veins, and is particularly dense about the short transverse veins. Length, 9mm.

A specimen from Sierre Madre, Chihuahua, Mexico, is in close agreement, except for paler palpi, and less dilute wing markings, so that there appears a more definite, irregular, apical costal spot joining that at the furcation and widely separated from the stigmal area by a hyaline interval. Eyes (relaxed) with fine "punctate" purple spots and no evidence of the usual *Chrysops* pattern. Thorax with prominent dark and grayish lines as described, but a narrow gray middorsal line splitting the median of the three heavy brown vittae mentioned by Townsend.

Because of dissimilarity to *Chrysops* of the antennae, distribution of facial pollinosity, "punctate" type of eye pattern, and

peculiarly shaped, finely wrinkled frontal callosities, the related Neotropical species *tanycerus* O. S., *megaceras* Bell., and *melanoptera* Hine have been included with *ceras* Towns. in a new genus *Assipala* (Philip, 1941, named for the "ace-of-spades-like" frontal callosity of the genotype species, *tanycerus;* it is a coincidence that the callosity in *ceras* should roughly resemble the ace of diamonds). Hine's (1917) key to the four species is in error on the antennal characters, and the characters of the last couplet separating *ceras* and *megaceras* are reversed although followed by Kröber (1926, p. 220).

Ceras is another of the peculiar Neotropical tabanid elements that has crossed the southern boundaries of the United States, and was overlooked in Brennan's review of the Pangoniinae of this region.

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Some Grass Aphid Host Records (Homoptera).[1]

By G. F. KNOWLTON and W. DON FRONK,
Utah Agricultural Experiment Station, Logan.

The following report includes a number of host records for grass aphids, not included in the Patch, Food-plant catalogue of the aphids of the world (Maine Agr. Exp. Sta. Bul. 393, 1938, 430 p.). One apparently undescribed *Amphorophora* is here described as new. All collections were made in Utah.

APHIS MAIDIS Fitch. In the experimental greenhouse at Logan, Utah, March 22, 1939, infesting *Poa nevadensis* (K.-M.

[1] Authorized for publication by the director, January 9, 1942. Report on project 51-A Hatch.

W. Allen); on *Dactylis glomerata* at Logan, Sept. 5, 1936.

A. MEDICAGINIS Koch. On grass at Morgan, May 21, 1938; alates on corn at Providence, July 23, 1935 (C. F. Smith); alate on wheat at Springville, June 15, 1938 (K.-L. L. Hansen).

A. MIDDLETONI Thos. On roots of a "yellow grass" at Garland, July 14, 1939.

A. SETARIAE (Thos.). On wheat at Ephraim, Aug. 5, 1938 (K.-L. L. Hansen).

RHOPALOSIPHUM NYMPHEAE (L.). On foxtail grass, American Fork, July 19, 1936.

R. PRUNIFOLIAE (Fitch). Collected in greenhouse at Logan, February and March of 1937, on *Agropyron pauciflorum, Bouteluoa gracilis* and *B. marginatus, Bromus marginatus* and *B. inermis, Elymus virginicus* and *E. triticoides, Festuca elatior* (K.-M. W. Allen); on tall bunchgrass at Tremonton.

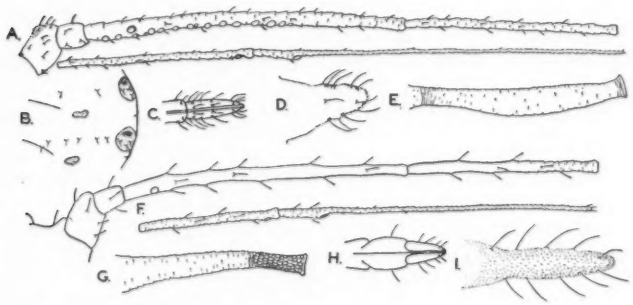

Fig. 1. *Amphorophora alleni* n. sp. Alate, A.-E. *Macrosiphum granarium* (Kirby). Apterous, F.-I.

Amphorophora alleni n. sp.

Alate vivipara: body 3.1 mm. long; antennae 3.53 mm. long, dusky; antennal III, 0.96 with 15 to 18 sensoria; IV, 0.64 to 0.72; V, 0.576; VI, 0.16 + 0.96; rostrum reaches hind coxae; rostral IV + V, 0.192 mm. long, slenderly obtuse at tip, armed with conspicuous hairs; hind tibiae 2.43; hind tarsi 0.144; abdomen with 6 conspicuous blackish lateral spots on each side, each containing several blunt to capitate, short hairs (fig. B.)

which form part of the row extending across the abdominal segment; also 3 or 4 pairs of smaller dorso-lateral dark patches; cornicles dusky, 0.68, lightly imbricated; cauda dusky, 0.29 mm. long with 4 to 6 lateral hairs on each side.

Collection: Taken on grass at Lincoln, Tooele County, UTAH, June 2, 1938 (G. F. Knowlton and L. L. Hansen). *Type* in the writer's collection.

Taxonomy: This does not readily key out in Mason's key (U. S. Nat. Mus. Proc. 69 [Art. 20]: 5-6, 1925). It runs to *A. ribiella* (Davis) in Gillette and Palmer's key (Ent. Soc. Amer. Ann. 27: 134, 1934) from which it differs in possessing: Fewer antennal sensoria; also longer hind tibiae, rostral IV + V, cornicles, and antennals III, IV and V.

MACROSIPHUM DIRHODUM (Walk.). On *Bromus tectorum* at Moab, June, 1935.

M. GRANARIUM (Kirby). In greenhouse at Logan, Utah, Feb. 26, 1937, on *Agropyron curlependula, A. gracilis, A. marginatus, Bromus inermis, B. marginatus, Elymus triticoides, E. virginicus, Festuca elatior;* also on foxtail grass at American Fork and oats at Aurora and Mendon.

M. SOLANIFOLII (Ashm.). On *Graminum* at Santa Clara, May 1, 1934.

M. PISI (Kalt.). Numerous winged specimens collected upon various grasses and wheat, but probably all were accidentals.

MYZUS PERSICAE (Sulzer). On *Agropyron elongatum* in Logan greenhouse, Dec. 15, 1939 and *Bromus,* Sept. 11, 1937 (K.-M. W. Allen); *Zea mays,* Farmington.

TETRANEURA GRAMINIS Monell. On woolly orchard grass and rice cut grass at Hooper and Ogden, Sept. 15, 1936.

GEOICA PHASEOLI Pass. and G. SQUAMOSA Hart. were collected on grass roots and in ant nests in Logan Canyon, March 24, 1933 (Det. A. C. Maxson).

FORDA OLIVACEA Rohwer. Collected on roots of Bermuda grass at Sunset, Oct. 11, 1936, tall bunchgrass roots at Salt Lake City (Det. A. C. Maxson).

Current Entomological Literature

COMPILED BY THE EDITORIAL STAFF.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

This list gives references of the current or preceding year unless otherwise noted. All continued papers, with few exceptions, are recorded only at their first installment.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

Note. References to papers containing new forms or names not so stated in titles are followed by (•); if containing keys are followed by (k); papers pertaining exclusively to neotropical species, and not so indicated in the title, have the symbol (S) at the end of the title of the paper.

The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the list of Periodicals and Serials published in our January and June issues. This list may be secured from the publisher of Entomological News for 10c. The number of, or annual volume, and in some cases the part, heft, &c., the latter within ( ) follows; then the pagination follows the colon :

Papers published in the Entomological News are not listed.

GENERAL.—Augustson, G. F.—Ectoparasite-host records from the Sierran Region of east-central California. [38] 40: 147-157, ill. **Blackwelder, R. E.**—The entomological work of Adalbert Fenyes. [55] 18: 17-22. **Brues, C. T.**—Insects as carriers of poliomyelitis virus. [68] 95: 169-170. **Cannon, H. G.**—On chlorazol Black E and some other new stains. [J. Roy. Micr. Soc.] 61: 88-94. **Eltringham, H.**—Obituary. By G. D. H. Carpenter. [31] 149: 72. Obituary by R. W. L. [8] 78: 16. **Emerson, A. E.**—Biological sociology. [Denison Univ. Bull.] 41: 146-155. **Fraser, F. C.**—The date of publication of the Monographie des Gomphines de Selys. [8] 78: 42. **Gillette, C. P.**—In Memoriam. By F. B. Paddock. [Proc. Iowa Acad. Sci.] 48: 35-39, ill. **Goodliffe, F. D.**—Studies on insects bred from barley, wheat, maize and oats. [22] 32: 309-325, ill. **Hamilton, H. L.**—The biological action of rotenone on freshwater animals. [Proc. Iowa Acad. Sci.] 48: 467-479, ill. **Hope, J. G.**—Insect associates of Cakile edentula, the American sea rocket. [Bull. Wagner Free Inst. Sci.] 17: 5 pp. **Hopping, R.**—Obituary by Blaisdell & Van Dyke. [55] 18: 1-3, ill. **Mayo, N.**—Entomological services of the State Department of Agriculture. [39] 24: 71-75. **McCracken, I.**—Gall Insects. [55] 18: 22. **O'Kane, Glover & Blickle**—An insect toximeter. Penetration of certain liquids through the pronotum of the American roach. [Univ. N. Ham. Tech. Bull.] 74: 16 pp., ill. 76: 8 pp., ill. **Robertson, W. R. B.**—In

Memoriam. By A. E. Lambert. [Proc. Iowa Acad. Sci.] 48: 46-47, ill. **Ross, H. H.**—Distribution of Illinois insects. [Trans. Illinois State Acad. Sci.] 34: 236-237, ill. **Taylor, E.**—The use of methacrylate resin in the preservation of insect specimens. [8] 78: 15. **Uvarov & Kalmus**—Properties of cuticle and insect ecology. [31] 149: 109-110. **Vazquez & Villasenor**—Estudios acerca del sistema nervioso de los Insectos. [112] 12: 773-779, ill. **Weiss, Soraci & McCoy**—The behavior of certain insects to various wavelengths of light. [6] 50: 1-34, ill. **Wood, S. F.**—Reactions of man to the feeding of Reduviid bugs. [J. Parasit.] 28: 43-49.

ANATOMY, PHYSIOLOGY, ETC.—Darlington, C. D.—Chromosome chemistry and gene action. [31] 149: 66-69. **Darlington & Dobzhansky**—Temperature and "sex-ratio" in Drosophila pseudobscura. [Proc. Nat. Acad. Sci.] 28: 45-48. **Stanley, John**—A mathematical theory of the growth of populations of the flour beetle Tribolium confusum Duv. V. The relation between the limiting value of egg population in the absence of hatching and the sex ratio of the group of adult beetles used in a culture. [84] 23: 24-31.

ARACHNIDA AND MYRIOPODA.—Barrows, W. M. and Ivie, W.—Some new spiders from Ohio. [Ohio J. Sci.] 42: 20-23, ill. (*). **Chamberlin, R. V.**—On a collection of Myriopods from Iowa. [4] 74: 15-17. **Fonseca, F. da**—Notas de acareologia. Posicao do genero Liponissus em face das esp. trop; seu desdobramento em nov. gen. [121] 2: 262-65, ill. (S). **Gregson, J. D.**—The coast tick (Ixodes californicus) problem in British Columbia. [4] 74: 3-5. **McGregor, E. A.**—The taxonomic status of the so-called "Common red spider". [10] 44: 26-29, ill. **Watson, J. R.**—A new Stephanothrips from Texas. [39] 24: 65-66.

THE SMALLER ORDER OF INSECTS.—Augustson, G. F.—A new flea from the Mojave Desert (California). [38] 40: 138-139, ill. Some new California Siphonaptera. [38] 40: 140-146, ill. The allotype of Geusibia ashcrafti. [38] 40: 157-159, ill. **Deevey & Bishop**—A fishery survey of important Connecticut lakes. Procedures in a limnological survey. [Conn. Sta. Geol. & Nat. Hist. Surv.] Bull. 63, pp. 92-98, ill. **Frison, T. H.**—Descriptions, records and systematic notes concerning western North American stoneflies. [55] 18: 9-16, ill. **Good, N. E.**—Megabothris

abantis description of the female. [103] 15: 7-9, ill. **Hopkins, G. H. E.**—The Mallophaga as an aid to the classification of birds. [Ibis] 6: 94-106. **Pendleton, R. L.**—Some results of termite activity in Thailand soil. [Thai Sci. Bull.] 3: 30-53, ill. **Pierce, W. D.**—The phylogenetic position of the Strepsiptera as determined by the first larva. [38] 40: 121-125. See Fraser under General.

ORTHOPTERA.—da Costa-Lima, A.—Um novo grilo cavernicola de Minas Gerais. (Phalangopsitidae). [Pap. Avul Dept. Zool. Secret. Agric. S. Paulo] (1940) 1: 43-49, ill. **Klostermeyer, E. C.**—The life history and habits of the ringlegged earwig, Euborellia annulipes. [103] 15: 13-18. **Pruthi, H. S.**—A fresh cycle of the desert locust in India. [Current Science] 10: 479-483, ill. **Slaughter, Evans & Goodrich—C**hanges in susceptibility to x-rays of certain embryonic cells of the grasshopper. [Proc. Iowa, Acad. Sci.] 48: 482-483. **Uvarov, B. P.**—New and less known southern Palaearctic Orthoptera. [1] 67: 303-361, ill. **Zeuner, F. E.**—The Locustopsidae and the phylogeny of the Acridodea. [107] 11: 18 pp., ill.

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A Lot of Insects, Entomology in a Suburban Garden. By Frank E. Lutz, Curator, American Museum of Natural History, Author of "Field Book of Insects." G. P. Putnam's Sons, New York, 1941. Pp. (8) + 304. Illustrated. $3.00.—Many kinds of insects are discussed or merely mentioned in this volume, beginning with a tropical bee that made its way to suburban New York, then migrating butterflies and migratory locusts, blister and lady beetles, ant- and aphis-lions, aphids and other Homoptera, English and other crickets, mantids and walking sticks, honey and bumble bees, ants, wasps and other Hymenoptera, termites, tiger beetles, tent caterpillars, more butterflies, moths, the rest of the beetles, the truly aquatic insects especially the caddis-flies, true flies and a summary of the insects in that suburban garden to the total of 1402 species. If one inquires as to why the order in which these

insects are treated, the answer appears to be given in the introduction and to be that of a lady partner of the author in a game of bridge, "when she has good cards she plays them in the order that she happens to think of them." The reader may be assured that he will not miss the lack of taxonomic order in reading this book.

The insects of which the author has most to say are those on which he has worked and experimented most: the wings and sounds of crickets, the color vision of bees, the materials used on the cases of caddis-worms, the genetics, color vision and resistance to varying atmospheric pressure of *Drosophila*. These discussions summarize much of Dr. Lutz's researches and in the last chapter, "In Addition," references are given to his papers in which these researches were published. But interesting work by other authors is also quoted. No. 22, "In Addition" (pp. 265-268, which should be supplemented by pp. 90-91), would be more interesting to a certain Mr. Pope of long ago, as it tells something of the early life of the author; it is appreciated by those who admire Dr. Lutz's work.

There are also many glimpses of the author's biological philosophy scattered throughout the book, some of which may be summarized thus: Needs do not induce structures. Structures are acquired, how, we often do not know, but if those structures permit an insect to live in a certain place it adopts that place and is not adapted to it (Nymphalid butterflies, p. 180 and p. 138). The same structures may equally, or nearly, as well enable the insect to live in a different kind of place (experiment with water-striders, pp. 224-225). Social insects (honey bee, ants, pp.123, 135) are no more successful (producing fertile individuals over a large area) than non-social insects (aphids, p. 135) and besides waste (from the success point of view as just defined) an immense amount of energy. Perhaps some things in nature (floral colors *in re* insects, p. 108, trash-carrying habits of aphis-lions, p. 43, some sounds made by insects, p. 74, mimicry, p. 182) are not useful to their possessors. If the reader does not believe in this philosophy, let him read this book to learn why he should or shouldn't.

We shall not quote the untaken bet which had something to do with the origin of this book, but we shall observe that the Century Dictionary (the one which happens to form a part of our environment) gives nine meanings for the word "lot." The author of this attractive volume is holding his sides, watching to see how many of his reviewers and readers will take it in that the title is a pun.—P. P. CALVERT.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

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